CLAIMS

1. A packaging insertion apparatus for inserting flexible bags into packaging containers, comprising:

a container receiving area for receiving containers being supplied to the insertion apparatus;

a bag dispenser for dispensing flexible bags to a position adjacent the container receiving area for insertion of the flexible bags into the containers;

at least one movable vacuum head for engaging a flexible bag supplied by the bag dispenser to allow the flexible bag to be positioned for insertion into a container positioned in the container receiving area;

at least one vacuum head operator for moving the at least one movable vacuum head into engagement with the flexible bag supplied by the bag dispenser and for positioning the flexible bag for insertion into the container held in the container receiving area;

at least one insertion assembly having a mandrel for engaging the flexible bag which is to be inserted into the container held in the container receiving area, wherein the insertion assembly has a retracted position where the mandrel is ready to engage and insert the flexible bag into the container in the container receiving area, and an extended position where the mandrel is positioned within the container in the container receiving area having inserted the flexible bag into the container;

wherein the at least one movable vacuum head is movable into engagement with a subsequent flexible bag held by the bag dispenser while the mandrel is in the extended position.

2. The apparatus of claim 1, wherein the at least one movable vacuum head includes two movable vacuum heads.

3. The apparatus of claim 1, wherein the at least one movable vacuum head includes a plurality of movable vacuum heads.

4. The apparatus of claim 1, wherein the at least one movable vacuum head may be controllably moved to engage the flexible bag supplied by the bag dispenser while the mandrel is in the extended position.

5. The apparatus of claim 2, wherein each of the movable vacuum heads may be controllably moved along opposite sides of the mandrel to engage the flexible bag supplied by the bag dispenser, and which may further be controllably moved to assist in positioning the flexible bag for insertion into the container.

6. The apparatus of claim 1, and further comprising at least one rear vacuum head which may be controllably moved to assist the at least one movable vacuum head in engaging the flexible bag held by the bag dispenser.

7. The apparatus of claim 1, and further comprising a cuffing assembly adapted for use in cuffing an open end of the flexible bag over top edges of the container into which the flexible bag was inserted.

8. The apparatus of claim 7, wherein the cuffing assembly further comprises:

at least one cuffing finger positioned on two opposing sides of the container; and

at least one actuating means operably coupled to the cuffing fingers for selectively moving the cuffing fingers between a first position to facilitate initial placement of the mandrel and the flexible bag into the container, and a second position in which the cuffing fingers are adapted to spread the open end of the flexible bag and invert the open end of the flexible bag over the top edges of the container.

9. The apparatus of claim 8, wherein the cuffing assembly is operably coupled with at least one actuating means for raising and lowering the cuffing assembly.

10. The apparatus of claim 8, wherein the cuffing fingers are not mounted on the insertion assembly, and wherein the cuffing fingers are operable to cuff the open end of the flexible bag over the top edges of the container while the mandrel is in the retracted position, and wherein the cuffing fingers are operable to cuff the open end of the flexible bag over the top edges of the container while the mandrel is in the extended position, and wherein the cuffing fingers are operable to cuff the open end of the flexible bag over the top edges of the container while the mandrel is moving between the retracted and extended positions.

11. The apparatus of claim 8, wherein the at least one actuating means operably coupled to the cuffing fingers includes two separate rotational actuating means for selectively moving the cuffing fingers between the first position and the second position.

12. The apparatus of claim 7, wherein the insertion assembly includes a mandrel.

13. The apparatus of claim 7, wherein the insertion assembly includes a mandrel which discharges air as the mandrel enters the flexible bag, to facilitate bag placement.

14. A packaging insertion apparatus for inserting flexible bags into packaging containers, comprising:

a bag dispenser for dispensing flexible bags which are to be inserted into containers;

an insertion assembly which moves between a retracted position where the insertion assembly is ready to insert a flexible bag into a container, and an extended position where the insertion assembly is positioned within the container having inserted the flexible bag into the container; and

at least one movable vacuum head for engaging and positioning the flexible bags supplied by the bag dispenser in preparation for insertion of the flexible bags into the containers, wherein the at least one movable vacuum head may engage a flexible bag supplied by the bag dispenser while the insertion assembly is in the extended position.

15. The apparatus of claim 14, wherein the at least one movable vacuum head includes two movable vacuum heads.

16. The apparatus of claim 14, wherein the at least one movable vacuum head includes a plurality of movable vacuum heads.

17. The apparatus of claim 15, wherein each movable vacuum head may be controllably moved along a separate path on opposite sides of the insertion assembly to engage a flexible bag held by the bag dispenser while the insertion assembly is in the extended position.

18. The apparatus of claim 14, wherein the insertion assembly has a mandrel for engaging the flexible bags which are to be inserted into the containers, and wherein the mandrel travels with the insertion assembly as it moves between the retracted position and the extended position.

19. The apparatus of claim 18, wherein the mandrel is a mandrel.

20. The apparatus of claim 18, wherein the mandrel is a mandrel which discharges air as the bullet mandrel enters the flexible bag, in order to facilitate bag placement.

21. The apparatus of claim 14, and further comprising at least one rear vacuum head which may be controllably moved to assist the at least one movable vacuum head in engaging the flexible bag held by the bag dispenser.

22. The apparatus of claim 14, and further comprising a cuffing assembly adapted for use in cuffing an open end of the flexible bag over top edges of the container into which the flexible bag was inserted.

23. The apparatus of claim 22, wherein the cuffing assembly includes at least one actuating means for raising and lowering the cuffing assembly.

24. The apparatus of claim 23, wherein the cuffing assembly further comprises:

at least one cuffing finger positioned on two opposing sides of the container; and

at least one actuating means operably coupled to the cuffing fingers for selectively moving the cuffing fingers between a first position to facilitate initial insertion of the flexible bag into the container, and a second position in which the cuffing fingers are adapted to spread the open end of the flexible bag and invert the open end of the flexible bag over the top edges of the container.

25. The apparatus of claim 24, wherein the at least one actuating means operably coupled to the cuffing fingers includes two separate rotary actuators.

26. The apparatus of claim 24, wherein the cuffing fingers are not mounted on the insertion assembly, and wherein the cuffing fingers are operable to cuff the open end of the flexible bag over the top edges of the container while the insertion assembly is in the retracted position, and wherein the cuffing fingers are also operable to cuff the open end of the flexible bag over the top edges of the container while the insertions assembly is in the extended position, and wherein the cuffing fingers are operable to cuff the open end of the flexible bag over the top edges of the container while the mandrel is moving between the retracted and extended positions.

27. A method of inserting flexible bags into packaging containers, comprising the steps of:

dispensing flexible bags from a bag dispenser for insertion of the flexible bags into containers;

engaging a flexible bag supplied by the bag dispenser with at least one movable vacuum head;

positioning the flexible bag for insertion into a container by moving the at least one movable vacuum head;

inserting the flexible bag into the container with an insertion assembly, by moving the insertion assembly to an extended position; and

engaging a subsequent flexible bag held by the bag dispenser with the at least one movable vacuum head while the insertion assembly is in the extended position having inserted the flexible bag into the container.

28. A method according to claim 27, wherein after the inserting, the method further comprises cuffing an open end of the flexible bag over top edges of the container into which the flexible bag was inserted.

29. The method of claim 27, wherein the moving at least one moveable vacuum head to the bag dispenser to engage a flexible bag comprises moving two movable vacuum heads along separate paths on opposite sides of the insertion assembly toward the bag dispenser to engage the flexible bag supplied by the bag dispenser.

30. The method of claim 27, wherein the engaging the flexible bag comprises bringing the at least one vacuum head into apposition with the flexible bag supplied by the bag dispenser and developing sufficient vacuum pressure so that the flexible bag will substantially adhere to the at least one movable vacuum head.

31. The method of claim 27, wherein the moving the vacuum head to position the flexible bag for insertion into the container in the container receiving area comprises moving at least a portion of an open end of the flexible bag so that the open end of the flexible bag will accept the insertion assembly.

32. A method of inserting flexible bags into packaging containers, comprising the steps of:

supplying containers to a container receiving area;

dispensing flexible bags from a bag dispenser to the container receiving area for insertion of the flexible bags into the containers;

moving at least one moveable vacuum head to engage a flexible bag;

engaging the flexible bag with the at least one vacuum head so that the flexible bag may be positioned for insertion into the container positioned in the container receiving area;

moving the vacuum head to position the flexible bag for insertion into the container positioned in the container receiving area;

inserting the flexible bag into the container positioned in the container receiving area using an insertion apparatus; and

moving the at least one vacuum head to the bag dispenser and into engagement with a subsequent flexible bag supplied by the bag dispenser while the insertion apparatus is in an extended position having inserted the flexible bag into the container positioned within the container receiving area.